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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,313	11/08/2001	Yukihiko Tanizawa	11-071	5198

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EXAMINER

DEB, ANJAN K

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/986,313		<b>Applicant(s)</b> TANIZAWA, YUKIHIKO	
	<b>Examiner</b> Anjan K Deb		<b>Art Unit</b> 2858	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 06 May 2003.

2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-4 and 6-21 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☒ Claim(s) 13 and 16 is/are allowed.

6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.

7) ☒ Claim(s) 8-12 is/are objected to.

8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 06 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All   b) ☐ Some \* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Amendment*

1. This office action is in response to amendment filed on 5-6-03.

### *Response to Arguments*

2. In response to applicants arguments regarding rejections of claims 1-4, 14-15, 17-18 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,233,848 to Sato et al. in view of U.S. Patent No. 4,576,052 to Sugiyama that Sugiyama fails to teach (see arguments page 25 last paragraph, page 26 second paragraph) or suggest that the reference voltage can be kept constant irrespective of temperature variations, please refer to Sugiyama (column 5 lines 10-31) wherein it is clearly stated that strain gages 23 and 24 (assumed third and fourth resistors) have the same resistance ( $R_g$ ) and the difference between first temperature coefficient of resistance ( $\alpha_g$ ) and temperature coefficient of sensitivity ( $\beta_g$ ) is substantially equal to second temperature coefficient of resistance temperature ( $\alpha_f$ ), and output voltage at the operational amplifier is free from the influence of temperature (see Fig. 4,5).

The essence of this invention is a physical quantity detection device having strain gages in a circuit comprising four resistors (first, second, third, and fourth resistor) connected in a wheatstone bridge circuit wherein a reference voltage (divided voltage) produced between third

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and fourth resistor is made constant by having the same values of resistance and temperature coefficient of resistance for each of the third and fourth resistors, and wherein a difference between a first temperature coefficient of resistance of the second resistor is equal to the temperature coefficient of sensitivity of the resistor so as to achieve an output voltage representing a physical quantity that is free from the influence of temperature. The prior art U.S. Patent No. 4,576,052 to Sugiyama discloses this feature.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2,15,19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugiyama (US 4,576,052).

Re claims 1,15,19-21 Sugiyama discloses (Fig. 5) a physical quantity (pressure) detection device comprising an operational amplifier (51), a first resistor (21) connected between an inverting input (-) and a first referential potential (62), a second resistor (22) connected between the inverting input (-) and a second referential potential (63), first and second resistors have same temperature coefficient of resistance ( $\alpha_g$ ), a reference voltage generator circuit (62,24,23) generating a reference voltage supplied to a non-inverting input (+) of the operational amplifier (51), a feedback resistor (81) connected between inverting input of operational amplifier (51) and having a second temperature coefficient of resistance ( $\alpha_f$ ), the difference between the first

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temperature coefficient of resistance ( $\alpha_g$ ) and the temperature coefficient of sensitivity ( $\beta_g$ ) is equal to the second temperature coefficient of resistance ( $\alpha_f$ ), reference voltage generator circuit (62,24,23) includes third and fourth resistors (24,23) each having the same resistance ( $R_g$ ) and the same temperature coefficient of resistance ( $\alpha_g$ ) so that the reference voltage supplied to non-inverting input (+) of operational amplifier (51) is constant.

Re claim 2, Sugiyama discloses diffused resistor (diffusion strain gages 21-24 and feedback resistor 81) wherein impurity concentrations of feedback resistor 81 is different from impurity concentration of first and second resistor (21,22) (column 2 lines 32-43, column 6 lines 40-52).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 14, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Sugiyama (US 4,576,052).

Re claims 3, 17-18 Sugiyama discloses impurity concentrations in the range  $1.5 \times 10^{19}$  atoms/cm<sup>3</sup> and  $1.5 \times 10^{18}$  atoms/cm<sup>3</sup> respectively.

Sugiyama did not expressly disclose impurity concentrations of first and second resistor is in the range  $0.5 \times 10^{19}$  atoms/cm<sup>3</sup> and  $8 \times 10^{19}$  atoms/cm<sup>3</sup> respectively and impurity concentrations of feedback resistor is  $1.6 \times 10^{17}$  atoms/cm<sup>3</sup> and  $7 \times 10^{17}$  atoms/cm<sup>3</sup> respectively.

***Optimization Within Prior Art Conditions or Through Routine Experimentation:***

***MPEP 2144.05 Obviousness of Ranges.***

*Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and In re Geisler,*

*116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).*

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sugiyama by including resistors having impurity concentrations in a suitable range so that a large margin can be secured even though variations may occur during resistor fabrication process, thereby resulting in low cost (column 2 lines 40-44).

Re claim 14 Sugiyama did not expressly disclose reference voltage is determined such that almost the same current flows through first and second resistor (21,22) but is obvious because an operation amplifier circuit offers higher impedance.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sugiyama so that very little current flows into an operational amplifier circuit and almost all of current flowing through a first resistor flows through first and second resistor for achieving higher sensitivity in detecting a physical quantity.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama (US 4,576,052) in view of Sato et al. (US 4,233,848).

Re claim 4, Sugiyama did not expressly disclose that resistance of a first resistor changes with pressure and a resistance of a second resistor does not change with pressure (Fig. 2).

Sato et al. discloses that the resistance of first resistor 4 changes with pressure and the resistance of resistor 31 that does not change with pressure (Fig. 2).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sugiyama by including one sensing resistor whose value changes with pressure and a second resistance that does not change with pressure for obtaining larger output voltage difference from the wheatstone bridge for increasing the sensitivity of the detector.

8. Claim 6-7, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama (US 4,576,052) in view of Kato (US 5,042,307)

Re claims 6-7, Sugiyama did not expressly disclose trimming resistors.

Use of trimming resistors for calibration is well known in the art as disclosed by Kato wherein Kato (Fig. 1) discloses adjustable (trimming) resistors (22, 23, 26) are provided for zero point adjustment.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sugiyama et al. by adding trimming resistors disclosed by Kato for zero point adjustment required for detector calibration.

*Allowable Subject Matter*

9. Claims 8-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 13,16 are allowed.



***Reasons for Allowance***

11. Claims 8-12,16 are allowable because the prior art does not teach or fairly suggest non-inverted input of another operational amplifier is directly supplied with a reference voltage generated by reference voltage generator circuit.

12. Claim 13 is allowable because the prior art does not teach or fairly suggest a sensing element and feedback element having non-linear temperature sensitivities represented by:

$S(T)=S_0(1+\beta_1 \cdot T + \beta_2 \cdot T^2)$ ,  $R(T)=R_0(1+\alpha_1 \cdot T + \alpha_2 \cdot T^2)$ ,  $RT_s(T)=RT_{s0}(1+A_1 \cdot T + A_2 \cdot T^2)$  respectively.

***Pertinent Art***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Takaishi (US 5,418,455) discloses position detection device using a Wheatstone bridge circuit (10) composed of four resistive elements, wherein the output voltage at terminal O<sub>1</sub> of the Wheatstone bridge (10) varies with variable resistance elements (1a, 1b) while the resistance values of the resistors R1 and R2 do not vary and a constant reference voltage is provided from the output terminal O2 of Wheatstone bridge (10) (Fig. 5).

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

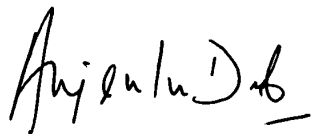
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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

*Contact Information*

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.

**Anjan K. Deb**

Patent Examiner

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5/10/03

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